Low Impact Development Water Quality Crediting Spreadsheets

LID Credits -- LOW IMPERVIOUS COVER (< 40%) -- Table Organization

cells in blue are data entry cells
cells in yellor are calculated results

Project Name:	
Site Area (acres):	
Impervious Cover (%):	
Impervious Cover (acres):	

STEP 1: Credits

Credit	Volume Reduction Credit (%)	Unit	Credit Area (ac)	I-Reduction (acres)
1. Reforesting Riparian Area	50	acres forested		
2. Expanding/Protecting Riparian Area	50	acres expanded and/or protected		
3. Open Space Conservation				
3a. A/B Soils	75	acres conserved		
3b. C/D Soils	50	acres conserved		
4. Open Space Conservation w/ Hydrologic Function				
4a. A/B Soils	100	acres conserved		
4b. C/D Soils	75	acres conserved		
5. On-Lot Rain Garden, Dry Well, Infiltration Practice				
5a. A/B Soils	100	acres of rooftop treated		
5b. C/D Soils	50	acres of rooftop treated		
6. Rainwater Harvesting				
6a. Ran Barrels (small storage)	10	acres of rooftop treated		
6b. Cisterns (large storage)	25	acres of rooftop treated		
7. On-Lot Soil Amendments				
7a. Just soil amendment	25	acres amended		
7b. With impervious disconnection	50	acres amended		
8. Pervious Parking				
8a. A/B Soils; infiltration design	100	acres of pervious parking		
8b. C/D Soils; underdrain design	50	acres of pervious parking		
8c. Other parking draining to perv. parking	25	acres draining to pervious parking		
9. Green Roof				
9a. Extensive	50	acres of green roof		
9b. Intensive	75	acres of green roof		
10. Grass Channels				
10a. A/B Soils	75	Impervious acres draining to grass channel		
10b. C/D Soils	50	Impervious acres draining to grass channel		
11. Other Impervious Disconnection				
11a. A/B Soils	50	impervious acres treated		
11b. C/D Soils	25	impervious acres treated		
		TOTAL CREDIT AREA		
		ADJUSTED IMPERVIOUS AREA		
		ADJUSTED IMPERVIOUS %		

STEP 2: BMP Efficiency Requirement

Simple Method Calculation Parameters (post-development)		
P	Precipitation (inches/year)	
Pj	Fraction of Runoff Producing Events	
I	Adjusted Impervious Cover (%)	
Rv	Runoff Coefficient	
C	Mean Conc. of Total Phosphorus (mg/L)	
A	Area (acres)	

Post-Development Load (lbs./yr.)	
Required Removal (0.28 TP standard)	
Adjusted BMP Efficiency Requirement	

STEP 3: BMP Selection

BMP Type	Removal Efficiency for LOW Impervious Cover Site (< 40% I)
Infiltration 1	65%
Infiltration 2	95%
Bioretention 1	45%
Bioretention 2	55%
Extended Detention	30%
Filtering Practice 1	60%
Filtering Practice 2	65%
Constructed Wetland 1	45%
Constructed Wetland 2	75%
Wet Pond 1	50%
Wet Pond 2	75%

Low Impact Development Water Quality Crediting Spreadsheets

LID Credits -- LOW IMPERVIOUS COVER (< 40%) -- Table Organization

cells in blue are data entry cells
cells in yellor are calculated results

Project Name:	
Site Area (acres):	
Impervious Cover (%):	
Impervious Cover (acres):	=+b7*b8/100

STEP 1: Credits

Credit	Volume Reduction Credit (%)	Unit	Credit Area (ac)	I-Reduction (acres)
1. Reforesting Riparian Area	50	acres forested		=+d13*b13/100
2. Expanding/Protecting Riparian Area	50	acres expanded and/or protected		=+d14*b14/100
3. Open Space Conservation				
3a. A/B Soils	75	acres conserved		=+d16*b16/100
3b. C/D Soils	50	acres conserved		=+d17*b17/100
4. Open Space Conservation w/ Hydrologic Function				
4a. A/B Soils	100	acres conserved		=+d19*b19/100
4b. C/D Soils	75	acres conserved		=+d20*b20/100
5. On-Lot Rain Garden, Dry Well, Infiltration Practice				
5a. A/B Soils	100	acres of rooftop treated		=+d22*b22/100
5b. C/D Soils	50	acres of rooftop treated		=+d23*b23/100
6. Rainwater Harvesting				
6a. Ran Barrels (small storage)	10	acres of rooftop treated		=+d25*b25/100
6b. Cisterns (large storage)	25	acres of rooftop treated		=+d26*b26/100
7. On-Lot Soil Amendments				
7a. Just soil amendment	25	acres amended		=+d28*b28/100
7b. With impervious disconnection	50	acres amended		=+d29*b29/100
8. Pervious Parking				
8a. A/B Soils; infiltration design	100	acres of pervious parking		=+d31*b31/100
8b. C/D Soils; underdrain design	50	acres of pervious parking		=+d32*b32/100
8c. Other parking draining to perv. parking	25	acres draining to pervious parking		=+d33*b33/100
9. Green Roof				
9a. Extensive	50	acres of green roof		=+d35*b35/100
9b. Intensive	75	acres of green roof		=+d36*b36/100
10. Grass Channels				
10a. A/B Soils	75	Impervious acres draining to grass channel		=+d38*b38/100
10b. C/D Soils	50	Impervious acres draining to grass channel		=+d39*b39/100
11. Other Impervious Disconnection				
11a. A/B Soils	50	impervious acres treated		=+d40*b40/100
11b. C/D Soils	25	impervious acres treated		=+d41*b41/100

	TOTAL CREDIT AREA	=SUM(e13:e42)
	ADJUSTED IMPERVIOUS AREA	=+b9-e44
	ADJUSTED IMPERVIOUS %	**=100*e45/b7**

STEP 2: BMP Efficiency Requirement

Simple Method Calculation Parameters (post-development)		
P	Precipitation (inches/year)	43
Pj	Fraction of Runoff Producing Events	0.9
I	Adjusted Impervious Cover (%)	=e46
Rv	Runoff Coefficient	=0.05+(0.009*e52)
C	Mean Conc. of Total Phosphorus (mg/L)	0.28
A	Area (acres)	=b7

Post-Development Load (lbs./yr.)	=((e50*e51*e53)/12)* e54*e55*2.72
Required Removal (0.28 TP standard)	=+e57-0.28*e55
Adjusted BMP Efficiency Requirement	**=+e58/e57**

STEP 3: BMP Selection

BMP Type	Removal Efficiency for LOW Impervious Cover Site (< 40% I)
Infiltration 1	65%
Infiltration 2	95%
Bioretention 1	45%
Bioretention 2	55%
Extended Detention	30%
Filtering Practice 1	60%
Filtering Practice 2	65%
Constructed Wetland 1	45%
Constructed Wetland 2	75%
Wet Pond 1	50%
Wet Pond 2	75%

Low Impact Development Water Quality Crediting Spreadsheets

LID Credits -- LOW IMPERVIOUS COVER (< 40%)

cells in blue are data entry cells
cells in yellow are calculated results

Project Name:	
Site Area (acres)	100
Impervious (%)	40
Impervious Area (acres)	40

STEP 1. Credits

Credit	Volume Reduction Credit (%)	Unit	Credit Area (ac)	I Reduction (ac)
1. Reforesting Riparian Area	50	acres reforested	5	2.5
2. Expanding/Protecting Riparian Area	50	acres expanded and/or protected	5	2.5
3. Open Space Conservation				
3.a. A/B Soils	75	acres conserved	0	0
3.b. C/D Soils	50	acres conserved	5	2.5
4. Open Space Conservation w/ Hydrologic Function				
4.a. A/B Soils	100	acres conserved	0	0
4.b. C/D Soils	75	acres conserved	5	3.75
5. On-Lot Rain Garden, Dry Well, Infiltration Practice				
5.a. A/B Soils	100	acres of rooftop treated	0	0
5.b. C/D Soils	50	acres of rooftop treated	5	2.5
6. Rainwater Harvesting				
6.a. Rain Barrels (small storage)	10	acres of rooftop treated	0.5	0.05
6.b. Cisterns (large storage)	25	acres of rooftop treated	0	0
7. On-Lot Soil Amendments				
7.a. Just soil amendment	25	acres amended	3	0.75
7.b. With disconnection	50	acres amended	3	1.5
8. Pervious Parking				
8.a. A/B Soils, infiltration design	100	acres of pervious parking	0	0
8.b. C/D Soils, underdrain design	50	acres of pervious parking	0	0
8.c. Other parking draining to pervious parking	25	acres draining to pervious parking	0	0
9. Green Roof				
9.a. Extensive	50	acres of green roof	0	0
9.b. Intensive	75	acres of green roof	0	0
10. Grass Channels				
10.a. A/B Soils	75	impervious acres draining to grass channel	0	0
10.b. C/D Soils	50	impervious acres draining to grass channel	20	10
11. Other Impervious Disconnection				
11.a. A/B Soils	50	impervious acres treated	0	0
11.b. C/D Soils	25	impervious acres treated	0	0

TOTAL CREDIT AREA	26.05
ADJUSTED IMPERVIOUS AREA	13.95
ADJUSTED IMPERVIOUS %	**14**

STEP 2. BMP Efficiency Requirement

Parameter (post-development)		
P	Precipitation (in/yr)	43
P_j	Fraction of Runoff Producing Events	0.9
I	Adjusted Imperviousness Cover (%)	14
R_v	Runoff Coefficient	0.18
C	Mean Concentration of Total Phosphorus (mg/L)	0.28
A	Area (acres)	100

Post-Development Load (lb/yr):	43.12
Required Removal (0.28 TP standard)	15.12
Adjusted BMP Efficiency Requirement	**35%**

STEP 3. BMP Selection

BMP Type	Removal Efficiency for LOW Impervious Cover Site (< 40%)
Infiltration 1	65%
Infiltration 2	95%
Bioretention 1	45%
Bioretention 2	55%
Extended Detention	30%
Filtering Practice #1	60%
Filtering Practice #2	65%
Constructed Wetland 1	45%
Constructed Wetland 2	75%
Wet Pond 1	50%
Wet Pond 2	75%

Low Impact Development Water Quality Crediting Spreadsheets

	A	B	C	D	E
1	**LID Credits -- HIGH IMPERVIOUS COVER (> 40%) -- Table Organization**				
2					
3	cells in blue are data entry cells				
4	cells in yellor are calculated results				
5					
6	**Project Name:**				
7	**Site Area (acres):**				
8	**Impervious Cover (%):**				
9	**Impervious Cover (acres):**				
10					
11	**STEP 1: Credits**				
12	**Credit**	**Volume Reduction Credit (%)**	**Unit**	**Credit Area (ac)**	**I-Reduction (acres)**
13	**1. Reforesting Riparian Area**	50	acres forested		
14	**2. Expanding/Protecting Riparian Area**	50	acres expanded and/or protected		
15	**3. Open Space Conservation**				
16	3a. A/B Soils	75	acres conserved		
17	3b. C/D Soils	50	acres conserved		
18	**4. Open Space Conservation w/ Hydrologic Function**				
19	4a. A/B Soils	100	acres conserved		
20	4b. C/D Soils	75	acres conserved		
21	**5. On-Lot Rain Garden, Dry Well, Infiltration Practice**				
22	5a. A/B Soils	100	acres of rooftop treated		
23	5b. C/D Soils	50	acres of rooftop treated		
24	**6. Rainwater Harvesting**				
25	6a. Ran Barrels (small storage)	10	acres of rooftop treated		
26	6b. Cisterns (large storage)	25	acres of rooftop treated		
27	**7. On-Lot Soil Amendments**				
28	7a. Just soil amendment	25	acres amended		
29	7b. With impervious disconnection	50	acres amended		
30	**8. Pervious Parking**				
31	8a. A/B Soils; infiltration design	100	acres of pervious parking		
32	8b. C/D Soils; underdrain design	50	acres of pervious parking		
33	8c. Other parking draining to perv. parking	25	acres draining to pervious parking		
34	**9. Green Roof**				
35	9a. Extensive	50	acres of green roof		
36	9b. Intensive	75	acres of green roof		
37	**10. Grass Channels**				
38	10a. A/B Soils	75	Impervious acres draining to grass channel		
39	10b. C/D Soils	50	Impervious acres draining to grass channel		
40	**11. Other Impervious Disconnection**				
41	11a. A/B Soils	50	impervious acres treated		
42	11b. C/D Soils	25	impervious acres treated		
43					
44			TOTAL CREDIT AREA		
45			ADJUSTED IMPERVIOUS AREA		
46			**ADJUSTED IMPERVIOUS %**		
47					
48		**STEP 2: BMP Efficiency Requirement**			
49		**Simple Method Calculation Parameters (post-development)**			
50		**P**	Precipitation (inches/year)		
51		**Pj**	Fraction of Runoff Producing Events		
52		**I**	Adjusted Impervious Cover (%)		
53		**Rv**	Runoff Coefficient		
54		**C**	Mean Conc. of Total Nitrogen (mg/L)		
55		**A**	Area (acres)		
56					
57		Post-Development Load (lbs./yr.)			
58		Required Removal (2.68 TN standard)			
59		**Adjusted BMP Efficiency Requirement**			
60					
61		**STEP 3: BMP Selection**			
62		**BMP Type**		**Removal Efficiency for HIGH Impervious Cover Site (> 40% I)**	
63		Infiltration 1		40%	
64		Infiltration 2		65%	
65		Bioretention 1		45%	
66		Bioretention 2		55%	
67		Extended Detention		35%	
68		Filtering Practice 1		30%	
69		Filtering Practice 2		50%	
70		Constructed Wetland 1		25%	
71		Constructed Wetland 2		55%	
72		Wet Pond 1		30%	
73		Wet Pond 2		40%	

Low Impact Development Water Quality Crediting Spreadsheets

	A	B	C	D	E
1	**LID Credits -- HIGH IMPERVIOUS COVER (> 40%) -- Table Organization**				
2					
3	cells in blue are data entry cells				
4	cells in yellor are calculated results				
5					
6	**Project Name:**				
7	**Site Area (acres):**				
8	**Impervious Cover (%):**				
9	**Impervious Cover (acres):**	=+b7*b8/100			
10					
11	**STEP 1: Credits**				
12	**Credit**	**Volume Reduction Credit (%)**	**Unit**	**Credit Area (ac)**	**I-Reduction (acres)**
13	**1. Reforesting Riparian Area**	50	acres forested		=+d13*b13/100
14	**2. Expanding/Protecting Riparian Area**	50	acres expanded and/or protected		=+d14*b14/100
15	**3. Open Space Conservation**				
16	3a. A/B Soils	75	acres conserved		=+d16*b16/100
17	3b. C/D Soils	50	acres conserved		=+d17*b17/100
18	**4. Open Space Conservation w/ Hydrologic Function**				
19	4a. A/B Soils	100	acres conserved		=+d19*b19/100
20	4b. C/D Soils	75	acres conserved		=+d20*b20/100
21	**5. On-Lot Rain Garden, Dry Well, Infiltration Practice**				
22	5a. A/B Soils	100	acres of rooftop treated		=+d22*b22/100
23	5b. C/D Soils	50	acres of rooftop treated		=+d23*b23/100
24	**6. Rainwater Harvesting**				
25	6a. Ran Barrels (small storage)	10	acres of rooftop treated		=+d25*b25/100
26	6b. Cisterns (large storage)	25	acres of rooftop treated		=+d26*b26/100
27	**7. On-Lot Soil Amendments**				
28	7a. Just soil amendment	25	acres amended		=+d28*b28/100
29	7b. With impervious disconnection	50	acres amended		=+d29*b29/100
30	**8. Pervious Parking**				
31	8a. A/B Soils; infiltration design	100	acres of pervious parking		=+d31*b31/100
32	8b. C/D Soils; underdrain design	50	acres of pervious parking		=+d32*b32/100
33	8c. Other parking draining to perv. parking	25	acres draining to pervious parking		=+d33*b33/100
34	**9. Green Roof**				
35	9a. Extensive	50	acres of green roof		=+d35*b35/100
36	9b. Intensive	75	acres of green roof		=+d36*b36/100
37	**10. Grass Channels**				
38	10a. A/B Soils	75	Impervious acres draining to grass channel		=+d38*b38/100
39	10b. C/D Soils	50	Impervious acres draining to grass channel		=+d39*b39/100
40	**11. Other Impervious Disconnection**				
41	11a. A/B Soils	50	impervious acres treated		=+d40*b40/100
42	11b. C/D Soils	25	impervious acres treated		=+d41*b41/100
43					
44			TOTAL CREDIT AREA		=SUM(e13:e42)
45			ADJUSTED IMPERVIOUS AREA		=+b9-e44
46			**ADJUSTED IMPERVIOUS %**		**=100*e45/b7**
47					
48	**STEP 2: BMP Efficiency Requirement**				
49	**Simple Method Calculation Parameters (post-development)**				
50	**P**	Precipitation (inches/year)			43
51	**Pj**	Fraction of Runoff Producing Events			0.9
52	**I**	Adjusted Impervious Cover (%)			=e46
53	**Rv**	Runoff Coefficient			=0.05+(0.009*e52)
54	**C**	Mean Conc. of Total Nitrogen (mg/L)			1.12
55	**A**	Area (acres)			=b7
56					
57	Post-Development Load (lbs./yr.)				=((e50*e51*e53)/12)* e54*e55*2.72
58	Required Removal (2.68 TN standard)				=+e57-0.28*e55
59	**Adjusted BMP Efficiency Requirement**				**=+e58/e57**
60					
61	**STEP 3: BMP Selection**				
62	**BMP Type**				**Removal Efficiency for HIGH Impervious Cover Site (> 40% I)**
63	Infiltration 1				40%
64	Infiltration 2				65%
65	Bioretention 1				45%
66	Bioretention 2				55%
67	Extended Detention				35%
68	Filtering Practice 1				30%
69	Filtering Practice 2				50%
70	Constructed Wetland 1				25%
71	Constructed Wetland 2				55%
72	Wet Pond 1				30%
73	Wet Pond 2				40%

Low Impact Development Water Quality Crediting Spreadsheets

LID Credits -- HIGH IMPERVIOUS COVER (> 40%)

cells in blue are data entry cells
cells in yellow are calculated results

Project Name:	
Site Area (acres)	5
Impervious (%)	70
Impervious Area (acres)	3.5

STEP 1. Credits

Credit	Volume Reduction Credit (%)	Unit	Credit Area (ac)	I Reduction (ac)
1. Reforesting Riparian Area	50	acres reforested	0.1	0.05
2. Expanding/Protecting Riparian Area	50	acres expanded and/or protected	0	0.00
3. Open Space Conservation				
3.a. A/B Soils	75	acres conserved	0	0.00
3.b. C/D Soils	50	acres conserved	0.3	0.15
4. Open Space Conservation w/ Hydrologic Function				
4.a. A/B Soils	100	acres conserved	0	0.00
4.b. C/D Soils	75	acres conserved	0	0.00
5. On-Lot Rain Garden, Dry Well, Infiltration Practice				
5.a. A/B Soils	100	acres of rooftop treated	0	0.00
5.b. C/D Soils	50	acres of rooftop treated	0	0.00
6. Rainwater Harvesting				
6.a. Rain Barrels (small storage)	10	acres of rooftop treated	0	0.00
6.b. Cisterns (large storage)	25	acres of rooftop treated	0.5	0.13
7. On-Lot Soil Amendments				
7.a. Just soil amendment	25	acres amended	0	0.00
7.b. With disconnection	50	acres amended	0	0.00
8. Pervious Parking				
8.a. A/B Soils, infiltration design	100	acres of pervious parking	0	0.00
8.b. C/D Soils, underdrain design	50	acres of pervious parking	0.25	0.13
8.c. Other parking draining to pervious parking	25	acres draining to pervious parking	0.5	0.13
9. Green Roof				
9.a. Extensive	50	acres of green roof	0	0.00
9.b. Intensive	75	acres of green roof	0	0.00
10. Grass Channels				
10.a. A/B Soils	75	impervious acres draining to grass channel	0	0.00
10.b. C/D Soils	50	impervious acres draining to grass channel	0.5	0.25
11. Other Impervious Disconnection				
11.a. A/B Soils	50	impervious acres treated	0	0.00
11.b. C/D Soils	25	impervious acres treated	0.5	0.13

TOTAL CREDIT AREA	0.95
ADJUSTED IMPERVIOUS AREA	2.55
ADJUSTED IMPERVIOUS %	**51**

STEP 2. BMP Efficiency Requirement

Parameter (post-development)		
P	Precipitation (in/yr)	43
P_j	Fraction of Runoff Producing Events	0.9
I	Adjusted Imperviousness Cover (%)	51
R_v	Runoff Coefficient	0.51
C	Mean Concentration of Total Nitrogen (mg/L)	1.12
A	Area (acres)	5

Post-Development Load (lb/yr):	25.00
Required Removal (2.68 TN standard)	11.60
Adjusted BMP Efficiency Requirement	**46%**

STEP 3. BMP Selection

BMP Type	Removal Efficiency for HIGH Impervious Cover Site (> 40%)
Infiltration 1	40%
Infiltration 2	65%
Bioretention 1	45%
Bioretention 2	55%
Extended Detention	35%
Filtering Practice #1	30%
Filtering Practice #2	50%
Constructed Wetland 1	25%
Constructed Wetland 2	55%
Wet Pond 1	30%
Wet Pond 2	40%